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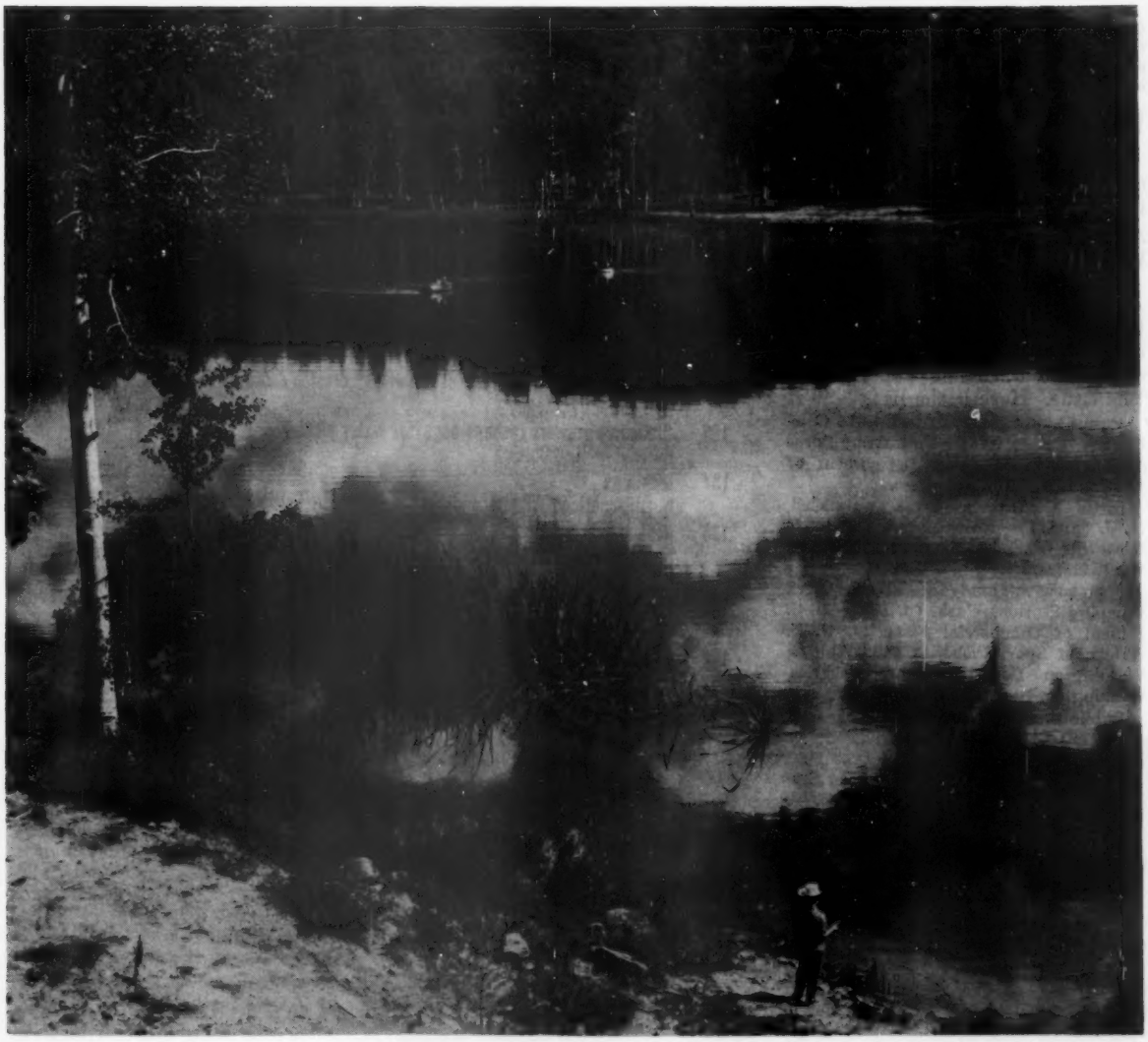
DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



WILDLIFE CONSERVATION AND HABITAT IMPROVEMENT
Reports on cooperative field activities

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

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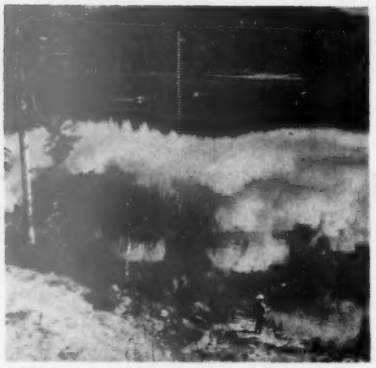

COVER: A recreation lake on a ranch in the Iron County Soil Conservation District in Utah provides a suitable environment for fish and man.

Working together . . . .

Our annual roundup of articles on wildlife conservation and habitat improvement is notable this year for the story it tells of interagency cooperation.

Eighteen different organizations (besides SCS, the local conservation district, and the landowner in each case) are participants in the seven field projects reported in this issue. Here is the list:

Public hunting area around Lake Cumberland, Ky. (p. 171)—U. S. Army Corps of Engineers, Kentucky Department of Fish and Wildlife Resources.

Little Contentnea Creek watershed, N. C. (p. 171)—North Carolina Wildlife Resources Commission, U. S. Fish and Wildlife Service.

Fish survival study at French Creek Pumping Station, Wash. (p. 173)—U. S. Bureau of Commercial Fisheries, U. S. Bureau of Sport Fisheries and Wildlife, Washington Department of Fisheries, Washington Department of Game.

Public shooting fields in Massachusetts (p. 175)—Massachusetts Division of Fisheries and Game.

New Hampshire Satellite Tracking Station (p. 176)—U. S. Air Force, U. S. Bureau of Sport Fisheries and Wildlife, New Hampshire Fish and Game Department, New Hamphire Cooperative Extension Service.

Attwater Prairie Chicken Refuge in Texas (p. 179)—World Wildlife Fund, U. S. Fish and Wildlife Service, Texas A&M University, Texas Parks and Wildlife Department, Cesar Kleberg Wildlife Foundation, King Ranch.

Glendale Game and Fish Area in Indiana (p. 180)—Indiana Department of Natural Resources.

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Conservation and land-management agencies are finding ways to work out their plans together so that wildlife has due consideration along with other resources in development projects. Here are two examples of multiple-agency planning that are paying off.

Coordination in wildlife conservation

Farmers help improve a lakeside hunting area

By William H. Casey
Biologist, SCS, Lexington, Ky.

Because four government agencies found a way to continue farming and use conservation practices to keep public land producing farm game, Kentucky has an outstanding public hunting area around Lake Cumberland, a reservoir constructed several years ago by the U. S. Army Corps of Engineers for flood control and power production.

Some 35,000 acres surrounding the permanent pool was acquired by the Corps to allow for water-level fluctuations. Much of this marginal land is flooded infrequently and some of it never. In 1963, the Corps entered into an agreement with the Kentucky Department of Fish and Wildlife Resources authorizing the State to develop and manage the area for public hunting.

A return to farming

Realizing that the natural growth of brush and trees on the former farmland would soon become too dense to support good numbers of quail, rabbits, and other wildlife, biologists of the Wildlife Department worked out an arrangement to return some of the land to farming.

To do this, the department subleased the land to farmers who would grow the crops the biologists wanted and follow good conservation practices.

Each farmer became a cooperator with the Pulaski County Soil and Water Conservation District. The Soil Conservation Service provided technical help to prepare a conservation plan for each tract, including needed wildlife habitat improvement practices.

A primary objective of the plans is to establish a food and cover pattern of maximum value to wildlife while using the land within its capability and keeping the soils productive.

For example, the plans provide for leaving strips of brush and trees around crop fields so the game animals will have protective cover adjacent to their food sup-

(Continued to p. 172)

Wildlife gets a break in watershed project

By John P. Edwards
Biologist, SCS, Raleigh, N. C.

Joint planning for wildlife habitat preservation and development can assure consideration of fish and wildlife along with other natural resources in watershed-protection and flood-prevention programs.

Federal and State wildlife agencies have cooperated with the Soil Conservation Service in planning the Little Contentnea Creek Watershed Project in North Carolina to accomplish that objective.

After the sponsors' application for a project under Public Law 566 had been approved, SCS asked

A greentree reservoir, combining woods and water for wildlife habitat is flooded in the winter when trees will not be damaged.

the North Carolina Wildlife Resources Commission to join in the preliminary investigation to determine the possible effects of the project on the fish and wildlife resources of the watershed.

The swamps and bottom lands of Little Contentnea Creek had furnished water, fish, game, and timber to local residents since the area was settled. In recent years flooding had become increasingly serious. Hurricane damage left the creeks heavily silted and clogged with debris so that water movement is severely retarded. In the summer of 1962 as much as 40 percent of some crops was destroyed.

Detailed wildlife study

The Wildlife Commission reported that the watershed was of high value for fish and wildlife and that if a project were carried out damages would occur to these resources. Consequently, the Soil Conservation Service asked that biologists from the commission, the U. S. Fish and Wildlife Service, and SCS make a detailed investigation of the watershed. This group, with the assistance of a soil conservationist, hydrologist, and engineer, investigated all of the areas in the watershed that could be affected by project construction and made an assessment of the extent of damages.

The investigation revealed that the more valuable fish and wildlife habitat was located in the lower section of the watershed; that fish such as eastern chain pickerel, warmouth, redfin, and largemouth bass were abundant; and that waterfowl and furbearers used the area extensively throughout the year since the stream and adjacent swamps provided valuable food and cover areas.

Following this joint study, the North Carolina Wildlife Resources Commission with the assistance of the Fish and Wildlife Service made a detailed fish and wildlife study of each stream and swamp run. The report included a map showing the types of vegetation and their value to game animals and birds and suggested ways in which damage could be reduced or averted. This report proved to be of valuable assistance to the planing staff in later project formulation.

As work on the watershed plan progressed, it became evident that some damage to fish and wildlife habitat was unavoidable if the degree of flood protection requested by the sponsors was to be achieved. But with the knowledge that the more valuable wildlife habitat was in the lower section of the watershed, the planning staff was able to formulate the project so as to minimize damages in that area. It specified that in the lower 8 miles of the project, only a floodway would be cleared to facilitate water movement. By eliminating channel excavation the plan will preserve an 8-mile section of fishing stream.

The three cooperating agencies then worked out measures to alleviate other damages to fish and wildlife habitat that might occur as a result of the works of improvement. At a later meeting with local sponsors, the mitigation measures were accepted and requested by the sponsors to be included in the plan.

Greentree reservoirs

Among the mitigation measures included in the final work plan are two impoundments with a total surface area of 70 acres. The lakes will be stocked with game fish and will be open to public fishing.

For waterfowl, three "greentree type" impoundments covering a total of 270 acres will be constructed. A "greentree" reservoir is an area of hardwood bottom land or swamp that is enclosed by a low levee having water-control structures so the area can be flooded during the season when waterfowl use it, from October to March. During the spring, summer, and early fall, the water is removed so the trees within the levee will not die.

The watershed work plan for Little Contentnea Creek has been completed and approved by Congress. Construction probably will begin in 1969.

Several other watersheds in eastern North Carolina and throughout the country have been planned using this same "team" approach. In North Carolina, the Chicod Creek watershed plan includes two greentree impoundments and one fishing lake and the Hobbsville-Sunbury watershed plan includes a large greentree impoundment. ♦

Hunting area

(Continued from p. 171)

ply. They also provide for keeping some crop fields out of production in certain years to permit wild food and cover plants to grow and for mowing the vegetation on these fields in strips to make the area more usable by game and more accessible to hunters.

Deer, quail, and rabbits

Not all the planned work has been done, but good progress is being made and the results to date are extremely satisfying. It is estimated that about 90 percent of the deer harvested in Pulaski County in 1966 was taken in this area. Quail hunting success has been better than the average for the State and rabbit hunting at least equal to the average. Mourning doves are using the area in increasing numbers.

This arrangement for providing good hunting on public land is enthusiastically endorsed by all the agencies concerned. So pleased is the Kentucky Department of Fish and Wildlife Resources that it plans to make similar arrangements for management of the lands around Nolin, Barren, Green River, Rough River, Cave Run, Buckham, Grayson Reservoirs, and others.

Arnold Mitchell, director of the Department's Division of Game Management, says "While the problem of finding a place to hunt is not so acute in Kentucky as in some other States, still many hunters rely heavily on public lands. We think the number of such hunters will increase in the years ahead and are trying to prepare for that increase."

For multiple benefits

Commenting in a similar vein, Col. J. L. Fishback, district engineer for the Army Corps of Engineers at Nashville, says, "Our arrangements with the Kentucky Department of Fish and Wildlife Resources and the progress that agency has made in developing wildlife habitat on project lands around Lake Cumberland are most satisfactory. In order that the public may realize maximum benefits from these lands, it is our wish that they be used for as many purposes as is consistent with the primary purposes for which they were acquired."

The Pulaski County District sees in this work an additional opportunity to implement its long range program.

"We are happy to participate in this effort to provide better hunting," says L. G. Colyer, chairman of the board of supervisors, "because one of the district's objectives is to assist in the development of recreational resources, either public or private." ♦

Irrigation planning

A soil survey is essential to irrigation planning. It is the basis for determining if the soils are irrigable and is used by the planner to fit the system to the soil. The location and extent of soils that differ widely must be considered in deciding how an area can be subdivided, if necessary, so that suitable application methods and required amounts of water can be determined.

French Creek Pumping Station at Snohomish was the site of the fish survival study.

Fish survive pumping plant

Cooperative study shows 80 percent of young salmon make trip without injury

By L. Dean Marriage and Richard N. Duncan
Regional fisheries biologist, SCS, Portland, Oreg., and fishery research biologist, U. S. Bureau of Commercial Fisheries, Pasco, Wash.

Juvenile salmon survived a fast, rough trip through a large flood pump in a cooperative test conducted by the Soil Conservation Service and the Bureau of Commercial Fisheries at Snohomish, Wash.

Objectives of the study were to determine whether young fish can survive the extensive pumping of floodwaters that is a necessary part of land and water management in the coastal plains of the Pacific Northwest and to explore the causes of fish deaths observed.

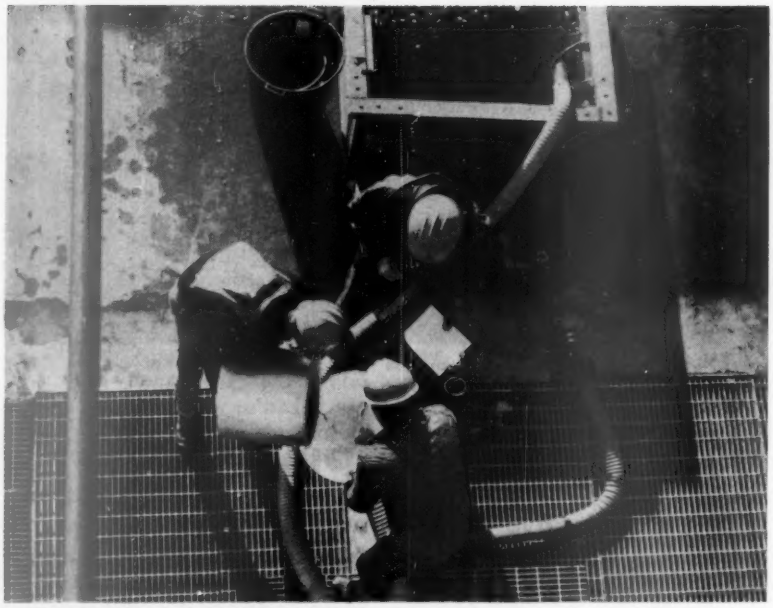
The study was carried on for 3 weeks in the spring of 1967 at the French Creek Pumping Station, part of the French Creek Watershed Project.

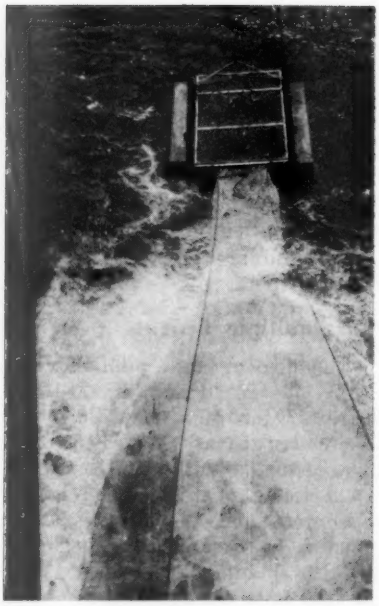
The Bureau of Commercial Fisheries provided funds, experienced help, and time-tested fish handling equipment; Bureau of Sport Fisheries and Wildlife provided juvenile salmon; Soil Conservation Service provided funds, facilities, help, and coordination services; Washington Department of Fisheries provided coho salmon fingerlings and use of hatchery facilities; Washington Department of Game provided trout; and the French Creek Flood Control District provided the use of its pumping plant.

The pump used in the test has a 3-bladed propeller 41 inches in diameter turning at a fixed rate of 440 r.p.m. and delivering about 70,000 g.p.m. at a lift of 9 feet—the average lift during the study. A large steel flap gate was attached to the discharge outlet.

Tattooed fingerlings were picked up at the Washington Department of Fisheries Skykomish Salmon Hatchery at Sultan and transported by truck in specially designed holding pens and live tank to the French Creek pumping plant, about 20 miles away. Each lot consisted of 100 coho salmon fingerlings averaging 4¼ inches long. The fish were tattooed near the head and tail with an identifying pigment.

At the pumping plant, the fish were transferred to plastic buckets and transported to the pump. They were washed into the pump by





Three men, seen from above, pour water and fish ino one of three hoses leading to different levels at the pump intake 40 feet below the deck. Funnel is shown at left on one of the hoses. The fish were recovered in a 45-foot long collection net and floating trap (right) attached to the discharge outlet of the pump.

means of 3-inch diameter flexible hose leading from the deck about 40 feet to one of three positions at the intake of the pump.

The fish passed through the pump system to a point below the outlet where they were recaptured in a 45-foot long tapered nylon net and trap attached to the discharge outlet.

The only times the fish were removed from the water were in the tattooing process and in removing them from the trap. All other transfers were made in water without manual handling.

Back at the hatchery, the live and dead fish were separated, identified by the color of the tattoo mark, and counted. The dead were then examined to determine the cause of death. The live fish were placed in holding pens in a hatchery pond for observation of delayed mortality.

The following results were observed:

(1) Eighty percent of the coho fingerlings passing through the pump survived without injury.

(2) Position of entry of the fish into the pump's intake did not affect the rate of survival.

(3) The flap gate which causes extreme water turbulence was not a factor in fish injuries.

(4) Results of limited tests on different sizes of fish (1¾ to 9 inches long) showed smaller fish survive better than larger ones.

(5) Introducing compressed air into the pump at a fixed rate did not alter the survival rate of fish tested.

(6) Most fish injuries were of a mechanical type that could be caused by the fish coming into contact with the propeller, guide vanes, or diffuser vanes within the pump.

The interagency pooling of experience, finances, equipment, manpower, and fish resources reduced the cost of the study to a fraction of what it would have been for a single agency. The information will be helpful in understanding the effects of pumps on fish and in planning future pump installations for the safety of fish. ♦

River basin surveys

River basin surveys are undertaken at the request of the cooperating State or Federal agencies. They serve to maintain coordination between the upstream watershed aspects for which USDA has responsibility and the downstream problems of water-resource use and development. ♦

Massachusetts improves its public pheasant shooting fields

By E. A. Swenson, Jr.
Biologist, SCS, Amherst, Mass.

When a ringnecked pheasant blasts the air with a whirr over a Massachusetts hunter, it's no accident. Chances are, the bird is there because of cooperative efforts by the Massachusetts Division of Fisheries and Game and the Soil Conservation Service to overcome land management problems associated with decreased private hunting land and increased numbers of hunters.

Since the mid 1950's, the division has directed all of its pheasant management efforts, and about one-third of its stocking, to division-owned or leased public shooting grounds. There are about 30,000 acres in 19 wildlife management areas. Fourteen of the areas contain habitat suited for the release of pheasants.

Management efforts are directed toward providing large acreages of open land where stocked birds are easily available to hunters. Since many of the wildlife management areas were wooded, or on nonagricultural land with soils poorly suited to growing tall grassy cover, specialized vegetation management techniques are needed to produce the required habitat for pheasants. The Soil Conservation Service has cooperated with the game division in developing successful plantings.

The problem was one of developing long-lived easily maintained herbaceous cover suitable for shooting fields. It should be 2 to 3 feet high; dense enough to provide cover for released pheasants, but through which hunters and dogs could easily maneuver; remaining erect until late November; and dense enough to retard the invasion of trees and shrubs.

Two wildlife management areas in eastern Massachusetts were selected as testing areas. One was the Crane Wildlife Management Area at Falmouth and the other was the Myles Standish Wildlife Management Area at Plymouth. Both are on deep droughty sands that had a rank growth of pitch pine and scrub oak.

Clearings were made in the brushy woods by bulldozing, and evaluation plantings were started with assistance from SCS plant materials specialists using plant materials from commercial sources and the SCS. Some 22 species of plants were seeded. The areas were duplicated as new clearings were made.

Pheasants were stocked and the areas were heavily hunted. From 1959 until 1965 the plantings were increased, observed, establishment methods refined, and evaluations were made.

In late November of 1966, the Massachusetts Division of Fisheries and Game and the SCS made their final evaluations of the plantings.

A mixture of sericea lespedeza and switchgrass had been most successful. The division has adopted a mixture of 20 pounds of Nebraska 28 switchgrass and 10 pounds of sericea lespedeza for developing shooting fields on the sand plains of eastern Massachusetts. The biologists believe that satisfactory cover for pheasant shooting fields can be maintained with the switchgrass-sericea mixture for 20 or more years with only minimal management.

Field evaluations were also made to test annuals used as smother crops on newly cleared woodland openings. Observations indicated that rye provides seed and forage as well as suitable cover during the several years of site preparation needed before final seeding.

Western Massachusetts has an

German millet (foreground) and pearl millet (background) are compared by Massachusetts District Game Manager Charles Styles in an early evaluation of annual "smother" crops for newly cleared game fields.

entirely different set of growing conditions, with heavy till soils, a cooler climate, and a shorter growing season. Additional field testing for that section was done at the Williamstown Wildlife Management Area in the Berkshire Hills of northwestern Massachusetts. Some 22 species representing 13 genera were established on existing fields and on newly cleared openings.

Observations over a period of years ruled out annuals and selected reed canarygrass as best for the highly varied soil complexes of this section of the State. Stands of reed canarygrass are easily established, furnish excellent cover for released pheasants, and are relatively simple to maintain.

Since the first pheasants were raised and released in Massachusetts in 1894, the management problems of providing enough of these sought-after birds have increased. Cooperatively developed land management techniques are now being applied to heavily stocked wildlife management areas and now promise to make pheasant hunting a rewarding, safe, and economically feasible sport. ♦

A wildlife border of sericea lespedeza next to a plowed area and bush lespedeza next to the woodland provides a combination of food and cover.

Satellite tracking station makes bombing range into wildlife area

By James F. Hayden
Work unit conservationist, SCS, Keene, N. H.

A landscape, once cratered and chewed up by the practice bombing and strafing of Navy and Air Force planes, now offers the quiet rustle and splash of abundant wildlife beneath the Air Force's soundless radar signal of the New Hampshire Satellite Tracking Station, New Boston, N. H.

A program that combines military and conservation uses of land, carried on with the cooperation of wildlife and conservation agencies, has earned the station a series of awards for achievement in conservation.

Most treasured are the General Thomas D. White Fish and Wildlife Trophies won in 1964 and 1966 in competition with all U. S. Air Force installations having less than 2,000 acres available for conservation practices.

Conservation achievement

The station has also received two Air Force citations and two Secretary of Defense citations for superior achievement in conservation. Also prized is a trophy from the Federated Sportsmen's Club of New Hampshire for the outstanding water-conservation program in the State in 1965.

Former station commander, Col. Benjamin F. Smotherman, started the program which has been continued under the present commander, Lt. Col. James H. McGahee.

The tracking station was completed in 1960 on an area of about 2,800 acres. About 1,900 acres, including 100 surface acres of ponds, was left untouched until Colonel Smotherman designated it as a conservation area in 1962.

When Ice Pond was stocked with brook trout by the Department of Interior's Bureau of Sport Fisheries and Wildlife, it created such an interest that the station commander appointed a conservation committee to plan and approve future projects for the station's Air Force and civilian personnel and their families.

The need for security does not allow public use.

Committee members include the commander, director of support, communications officer, base civil engineer, and the executive committee of the Rod and Gun Club.

A wildlife plan

In 1965 the tracking station signed an agreement with the Hillsborough County Conservation District. Aerial photos and soils maps of the station were prepared as part of a conservation plan.

Several agencies helped develop the plan. An SCS biologist and work unit personnel helped plan the land use, management of vegetation and plantings, and development of water bodies. Personnel of the U. S. Bureau of Sport Fisheries and Wildlife made the waterfowl and fisheries part of the plan. Forestry is under the guidance of the Cooperative Extension forester. The plan was reviewed by the New Hampshire Fish and Game Department.

Annually all parties concerned review the plan and decide on the coming year's activities. Heavy equipment from the base civil engineering section can be used on the projects, but volunteers do most of the work during off-duty hours.

About 2,500 brook trout are stocked each year in two ponds re-

claimed to eliminate rough or nongame fish. Access to the ponds has been improved by a new road and by clearing brush from the shorelines. Part of one pond lies outside the base and is open to public fishing with the adjacent landowner's permission.

Base personnel removed old bombing targets from Joe English Pond, one of the main targets for bombing practice, and stocked it with fish. Bass, pickerel, perch, and horned pout now abound in its waters. Woodduck boxes and food plantings attract a variety of ducks and Canada geese. Boating is possible from a new dock and launching ramp. Picnickers use several locations along its shores, and an access road leads to parking areas for hunters and fishermen.

A half-mile-long nature trail has been cleared and marked along the southern shore of Joe English Pond. The natural setting of the lake in the beautiful mountain landscape has been carefully preserved. Trees, shrubs, flowers, and ferns have been identified and labeled for the information of trail users.

Good pheasant hunting has resulted from a pheasant-raising program sponsored by the Rod and Gun Club. Two hundred and fifty chicks, supplied by the State of New Hampshire Fish and Game Department, were raised this year. The club supplies pens, food, and labor for the project. Forty percent of the birds may be claimed by the State if needed for stocking elsewhere.

Farmland formerly part of the strafing range, idle since World War II, was converted to an 18-acre shooting field. The area was cleared, and strips of corn, sudan, oats, and grass were planted for food and cover.

Other projects are a trap shooting range and a 1-acre dugout pond for fishing. Deer, grouse, and rabbits use the 25 acres of grass-legume food plots scattered around the station. ♦

Planning cover for shooting grounds varies with the aims of owners

By Clayton L. Heiney
Wildlife biologist, SCS, Harrisburg, Pa.

There's as much difference in planning wildlife cover for shooting grounds as there is in planning conservation cropping systems for general farms.

Take the case of Dr. Herman Gailey, Jr., of York County, Pa.

Dr. Gailey, a local orthopedic surgeon, wanted a place in the country that he could develop for wildlife and for training his German shorthair pointers. He was primarily interested in getting cover suitable for field trials for hunting dogs.

This turned out to be quite a different matter than growing cover for shooting grounds that emphasize hunting and strive for optimum harvest of game.

In Pennsylvania, commercially regulated shooting grounds use a great deal of moderately high growing vegetation, such as sericea lespedeza, sudangrass, sorghum, and switchgrass. However, when the grounds are to be used for field trials, the owners prefer perennial low-growing grasses that provide cover less than 2 feet high. The most successful have been reed canarygrass, smooth bromegrass, and tall fescue.

Soon after Dr. Gailey purchased his farm, he became a cooperator with the York County Soil and Water Conservation District. Work Unit Conservationist Robert Young and I worked with him in developing a plan for his land. In 5 years, he tried nearly 2 dozen species of grasses and legumes and an equal number of shrubs.

We found smooth bromegrass, reed canarygrass, and tall fescues most suitable for field trials because they provide excellent cover for planting of birds, and the veg-

A pheasant flushes from a food patch of sudangrass and sorghum.

etation does not obscure the visitors' view of the trials. Dr. Gailey prefers the perennial grasses to the annuals, such as sorghum and sudangrass, because they require little labor for maintenance.

Now, more than a dozen field trials are held each year on his farm. They attract hunting dog enthusiasts from all over the eastern seaboard.

There were few resident quails, rabbits, or pheasants on the farm when Dr. Gailey bought it. Today all three species are abundant, and the area serves as a reservoir for these animals that spill over onto the nearby farms. ♦

Maine towns plan natural resources

All towns and communities, large or small, in Maine's St. John-Aroostook Resource Conservation and Development Project are making natural resource conservation plans.

One of the project's first objectives is for every town to develop a natural resource plan. The 65 towns in the area, ranging in population from 100 to nearly 15,000 people, are sponsors of the project. Forty-five towns are well started on developing these plans.

A soil map is the basis of each plan. Specialists of the Soil Conservation Service and other resource agencies in Maine have developed soil suitability ratings for more than 30 different land uses. Most towns are using the resulting soil suitability maps.

As the people of a town get together to plan the development of their resources, these maps suggest many possibilities, stimulate progressive thinking, and sometimes reveal reasons for past failures.

Eddie Belanger, town manager of Ashland, referring to the soil suitability map for lagoon sewage disposal, said, "We could have saved at least $50,000 if we had had this map a year ago."

Town Manager Edgar Searway of Portage says, "If for no other reason, the maps are worth the time put into them just for their catalytic influence on the thinking of the planning groups."

Adrian Jacques, town manager of Madawaska in St. John Valley, says, "The soil maps help us to better solve our flooding and erosion problems."

Natural resource conservation planning usually begins with a meeting of town officials, the planning board, and representatives of Federal, State, and local agencies with natural resource development programs. These representatives explain agency programs and point out the many ways the communities can use the services. The town people review the soil suitability map ratings for many different land uses and then take over.

They hold regular meetings of representatives of service groups, fish and game clubs, women's clubs, chambers of commerce, and interested individuals.

Sylvio Michaud, town manager of St. Agatha, says, "The more people involved, the more interest generated; and this is what gets things done."

At their meetings, the local people develop a list of problems and opportunities. Some towns group together to develop a plan for a larger area. One such group had representatives from four different towns (Haynesville, Bancroft, Reed, and Glennwood). Many towns have comprehensive plans made by private planning consultants.

After studying the facts and the Federal and State services available, the local people make the decisions.

For example, in Nashville (30 people) the plan is to preserve the quality of the water of Little Machias Lake and create a picnic and tenting area for tourists.

In Caribou (12,000 people), the potato capital of the world, the issues are to reorganize the museum, construct a lake for recreation, build a golf course, study high-cost home construction, and plan for city parking and urban renewal.

Portage officials, because of their large natural lake, think their best opportunities lie in recreation oriented industry.

Even Presque Isle, the recently chosen "All American City," recognizes problems of flooding, erosion, and an unsanitary dump, and plans land treatment and development of recreation, cultural centers, and industry.—S. Von Day, *RC&D project coordinator, SCS, Presque Isle, Maine.* ♦

Effect of dams on trout streams studied

The Central Aroostook Soil and Water Conservation District, the Maine Department of Inland Fisheries and Game, and the Soil Conservation Service are cooperating on a study of the effect of flood-control dams on trout streams.

One water-temperature experiment in the Libby Brook watershed in Fort Fairfield is at a multipurpose floodwater-retention and recreation lake that has a surface area of 19 acres and a maximum depth of 20 feet.

In the study, a team of biologists will evaluate water-temperature fluctuation in the newly created artificial body of water and the stream below the structure.

As their contribution, the district leased temperature-recording instruments. Kendall Warner, fisheries biologist, Department of Inland Fisheries and Game, and David Allan, SCS biologist, jointly selected the locations for the instruments. Rommy Haines, Jr., son of a Central Aroostook District supervisor on whose farm the dam was built, assisted with the weekly maintenance of the recording instruments. This team found that trout growth and fishing have been excellent in the manmade lake and below the structure.—John C. Malley, *work unit conservationist, SCS, Presque Isle, Maine.* ♦

Conservation plan for Attwater prairie chicken

By Joseph T. Surovik, III
Biologist, SCS, Columbus, Tex.

Have you ever seen the nearly extinct Attwater prairie chicken, whose booming and strange courtship dance some say make one of the most thrilling spectacles of nature?

If you haven't your odds are increasing as a result of efforts of the World Wildlife Fund and the Colorado Soil and Water Conservation District.

The Attwater prairie chicken, a native of Texas, is a member of the grouse family and a near relative of the extinct heath hen that formerly ranged in New England.

Millions of the buff-colored prairie chickens once inhabited the flat, tall grass coastal plains of Texas and Louisiana.

A half century ago competitive hunters began shooting the chickens for sport like clay pigeons. And farmers started putting the lush grass pastures into cultivation. Now, only about 1,000 chickens are left.

In 1966, the World Wildlife Fund bought a 3,400-acre tract of land from Mr. and Mrs. David Winterman, I. V. Duncan, and Gardner Duncan, once the range of the largest of four colonies of the Attwater prairie chicken. This land, in the Bernard Prairies southeast of Columbus, Tex., is now known as the World Wildlife Fund Attwater Prairie Chicken Refuge.

SCS conservationists helped the refuge develop a soil and water conservation plan at the time the refuge became a cooperator with the Colorado District.

Dr. Ira Gabrielson, president, and Howard Dodgen, Texas representative, of the World Wildlife Fund; Val Lehman, wildlife manager of King Ranch; Tom Waddel, refuge caretaker, and I helped work out the plan.

Civil Engineer R. K. Curl (left) and the author use soil map and subsoil samples to determine water-holding ability of the soil for a pond on the refuge.

This group also used the resources of the U. S. Fish and Wildlife Service, Texas Parks and Wildlife Department, Texas A&M University, the Cesar Kleberg Wildlife Foundation, and other organizations interested in conservation.

Soil and capability maps by SCS served as a basis for developing the refuge's conservation plan. The work also included a range survey and determination of good sites for ponds and food and cover needs for wildlife.

The World Wildlife Fund is now beginning to put the plan into effect. ♦

Catfish processing plant to be built

Owners Eulon and James Enfinger of Hartford Lake in the Wiregrass Resource Conservation and Development Project, Ala., plan to construct a processing plant for locally produced catfish.

The plans call for a modern plant capable of turning out 10,000 pounds of fish a day and employing about 20 workers. Fish for the plant will be supplied from local ponds throughout the area by contract. More than 400 people desire to contract with the Enfingers to supply the catfish.

The plant is expected to be ready for operation by early summer.—C. F. LYLE, *project coordinator, RC&D, SCS, Ozark, Ala.* ♦

FHA disaster loans

Farmers Home Administration emergency loans to help farmers recover from natural disasters totaled $94,622,000 during fiscal year 1967. An accounting for the year ending June 30 showed that 22,174 farmers and ranchers throughout the Nation obtained loans to revive operations damaged by storms, floods, drought, freezes, and other hardships caused by the weather. ♦

A conservation plan for wildlife . . . .

Game biologists use farm practices to improve public hunting area

By James D. McCall and William B. Barnes
Biologist, SCS, and assistant director, Indiana Division of Fish and Game, Indianapolis, Ind.

The 6,000-acre Glendale Fish and Game Area in southwestern Indiana is an example of where "conservation planning pays off." It is just one of 14 public hunting and recreation areas covering 61,800 acres of State-owned or leased land where good soil and water conservation practices improve the quality of the environment for wild creatures.

George Seketa, area manager for the Indiana Department of Natural Resources, says, "It may require several years to develop this property to its fullest potential. However, the overall conservation plan will guide us to that goal."

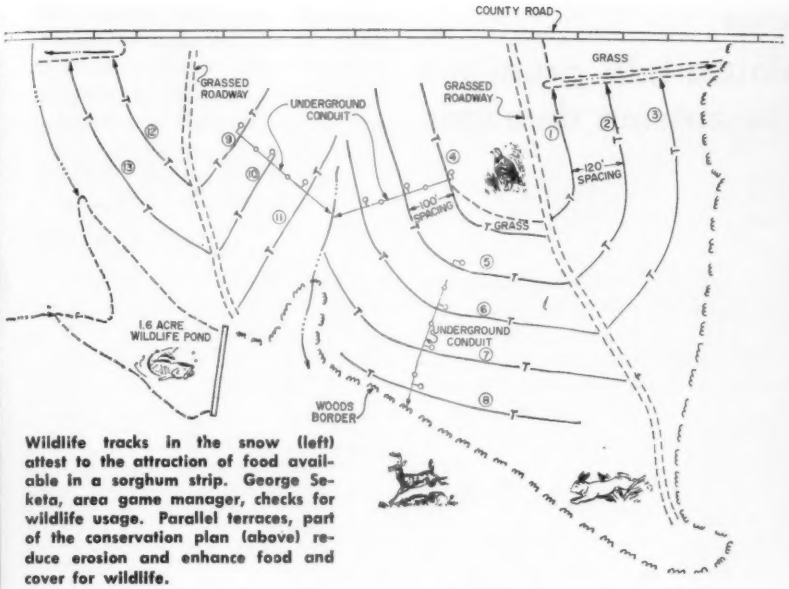
Early in 1966, Joe Branco, SCS conservationist working with the Daviess County Soil and Water Conservation District, assisted the fish and game biologists make a conservation plan designed to produce a maximum harvestable crop of fish and wildlife for sportsmen.

Several conservation practices have already been applied, and more are planned. On the land are a conservation cropping system, crop residue use, grasses and legumes in rotation, stripcropping, critical area plantings, wildlife ponds, firebreaks, fishpond stocking, grassed waterways, livestock exclusion, minimum tillage, plow planting, recreation access roads, tree planting, an erosion-control drop structure, and wildlife habitat development.

A major attraction is 1,400-acre Dogwood Lake. A water-control dam is now being constructed to create 30 acres of shallow water and will serve as a desilting basin to protect Dogwood Lake. When completed, this marsh will be used by ducks, geese, muskrats, raccoons, rails, gallinules, and probably more than 100 other species of vertebrate animals.

A system of parallel terraces with underground conduits for erosion control is planned for an area to be strip-farmed for production of wildlife food and cover. Woods and field borders of different heights and densities of vegetation are providing good homes for quail and rabbits. Such borders cannot be maintained if fields are abandoned and allowed to return to hardwoods.

Where the soils have only slight



Wildlife tracks in the snow (left) attest to the attraction of food available in a sorghum strip. George Seketa, area game manager, checks for wildlife usage. Parallel terraces, part of the conservation plan (above) reduce erosion and enhance food and cover for wildlife.

An old apple tree surrounded by brambles, timothy, and bluegrass is a "rabbit factory" in the eyes of Work Unit Conservationist Joe Branco.

limitations for row crops, the game management personnel lays out long, narrow fields. Hedgerows will be planted 200 to 400 feet apart to provide safe wildlife travel lanes. The fields between the woody borders will have a crop rotation including alternate strips of cultivated row crops, small grain, and meadow.

On rolling soils which have a severe erosion hazard, strip mowing is used to maintain the desired plant community.

Some soils lend themselves to a system of terraces, grassed waterways, and long meadow rotations. Other soils are so steep that woodland is the best land use. Still other soils and their associated topography provide excellent sites for impounding water.

The annual recreational use of the Glendale area exceeded 12,000 visitors before the 1,400-acre lake filled. Similar areas in Indiana have passed the 100,000-visitor mark after developments were completed.

Some of the activities now available at Glendale are hunting of squirrels, quail, pheasants, rabbits, and deer.

Fishing has been limited to the 13 ponds that have been constructed and stocked with game fish. The 1,400-acre lake is now filled and is open for fishing. It will also be open for certain kinds of boating and canoeing. Waterfowl hunting will be permitted outside the refuge area.

There is some berry picking and mushroom hunting. A bird dog field trial drew 250 people during a 2-day period last year. Other developments will provide camping, picnicking, hiking, bird and nature study, and school biology study areas. ♦

Proper land use and good conservation practices produce wildlife for the hunter. Rabbits are plentiful where both food and cover are adjacent throughout the year.

A breakthrough for conservation . . .

Capping Palouse hills promises answer to erosion damages

By Clarence A. Kelley
Work unit conservationist, SCS, Cheney, Wash.

"For a long time I've wanted to see those hills capped with permanent cover. Now it's actually happened."

Floyd Simpson, a Palouse wheat farmer who operates a 650-acre farm 15 miles west of Spokane, Wash., gazed across fields to the north and west.

Like many a Palouse farmer, Simpson has noted, with growing apprehension, the problem of erosion on the steep side slopes adjacent to the hilltops.

"I can remember times when every slope had ditches showing the effects of erosion," Simpson says. "North slopes of the rolling hills are the worst, being much steeper and with greater frost hazard than the south slopes."

Four years ago, during a farm planning session with an SCS soil conservationist, Simpson took the first step towards capping the hills of the farmland with permanent cover of alfalfa and perennial grasses.

Typical Palouse country has deep silt soils and rolling topography, with side slopes as steep as 55 percent. Much of the 19-inch average annual precipitation comes in the form of snow. Low winter temperatures and late springs result in snowmelt and runoff over frozen soil.

Compounding the problem are the outcroppings of lime deposits and finer-textured soils that have resulted from the loss of the surface mantle of silt through erosion. Sixty years of excessive tillage and compaction with heavy equipment have added to the problem. Hilltops and upper slopes are now showing a mixture of clay and lime low in organic matter, low in fertility, low in productivity, and low in permeability.

An aerial photograph and a detailed soil survey of Simpson's farm pinpointed problem areas—although their existence was not news to him.

The big question was: What to do about them?

Finding the answers began with a review of various cropping alternatives adaptable to the area. These ranged from a long-term rotation of grass and alfalfa with grain to a short-term system of grain and fallow in alternate years.

The trouble in this "in-between" rainfall area of southwest Spokane County is that moisture may be too low one year and too high the next. With too little moisture, the farmer may be seeding in dust; with too much rainfall, the exposed hilltops may be unable to absorb the excess, resulting in runoff down the steep slopes taking soil with it.

For Simpson, the best answer was to cap the hills with permanent grass and alfalfa seedings. This meant taking the steep slopes and ridges out of grain cropping altogether and establishing permanent cover on the critical erosion areas. The seedings were to extend down the slopes to the point where chiseling or uphill plowing was practical.

Dave Simpson cuts alfalfa-grass hay from hilltop seedings that now cover about 15 percent of his cropland.

Bands of grass and alfalfa (above) now cap the tops of hills and cover the steep upper slopes on Floyd Simpson's Palouse farm. The author (below) points out rill erosion and soil slippage on similar land left bare after fall plowing.

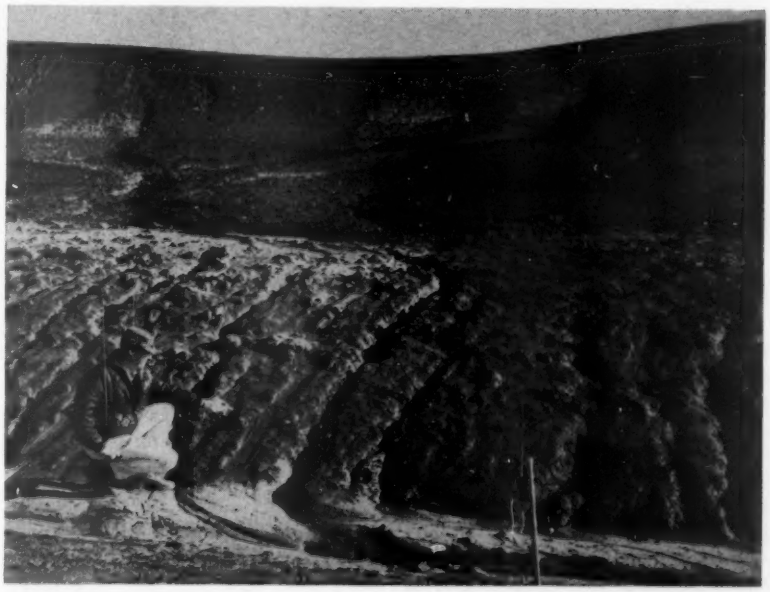
Diversions were considered but were decided against because of the steep slopes and lack of natural outlets.

This 650-acre farm had more than 100 acres of the problem areas. Considerable expense would be involved in seeding to permanent cover. The overall cropping system would have to be changed. Clearly, the transition would have to be extended. It was decided to seed about 35 acres each year until the project was completed.

The Spokane County Agricultural Stabilization and Conservation Committee has established a special hilltops seeding practice, paying 70 percent of seeding costs on eroded lands. Cost-sharing was made available to Simpson under this special practice.

The seeding program is now completed on Simpson's farm.

"I was lucky," he said, "getting some good stands of grass and alfalfa. It was a little slow to come up on some north slopes—but it's up and growing now."



Simpson cuts no hay on north slopes. Such areas remain undisturbed for soil protection. The permanent alfalfa-grass stands also provide cover for ring-necked pheasants of the area.

Hay yields on the caps average 1¼ tons per acre—"not a get-rich-quick proposition," Simpson admits.

"But now grain crops on higher class soils are doing better. I guess in the long-run it's a break-even project from the standpoint of cash crop returns."

It's more than break-even, though, for soil, water, and wildlife conservation. It's a distinct break-through for recognition of long-term benefits to be gained in capping the Palouse hills with permanent cover. ♦

District names winning farmer

The Loma Blanca Soil and Water Conservation District named one of its cooperators, Felipe Lucio of the La Mesa Community west of Rachal, Tex., "The Outstanding Farmer of the Year."

Lucio started farming in 1959 with 20 acres of cropland, 79 acres of brushland, and 1 acre for the farmstead. He believed cash crops of cotton and watermelons would bring enough money to clear the farm of brush. He learned that prolonged dry weather can reduce crop yields to where little profit can be made. He was determined to continue farming and sought assistance from the Loma Blanca District in 1962.

A conservation plan developed with the assistance of the Soil Conservation Service helped Lucio improve his 100-acre dryland farm by changing from cash crops to a grass and beef operation.

Of the 40 acres of brushland already cleared, Mr. Lucio planted 17 acres to buffelgrass in 1964. The Agricultural Stabilization and Conservation Service provided cost-sharing assistance.

Lucio started the change of land use to buffelgrass and forage sorghums to grow feed for his commercial crossbred beef animals. He fenced the farm into three pastures of 17, 22, and 40 acres, and kept 20 acres in cropland.

He currently has 14 animal units and with the grass establishment completed by 1969 will be able to maintain 20 animal units under good pasture management.

Lucio's accomplishments will be entered in the Goodyear Tire and Rubber Company's National Soil Conservation District Awards Program.—WELLAND A. WATSON, *work unit conservationist, SCS, Falfurrias, Tex.* ♦

District helps handicapped artist

Bill Anderson stands by the poster he painted for the Lycoming District.

As part of a handicapped young man's sign-painting instruction, the Lycoming Soil and Water Conservation District, Pa., commissioned William Anderson to paint a poster on the theme, "Help Keep our Land Beautiful."

The poster "Our Land Beautiful" is the result.

Mr. Anderson was born without arms or legs. Striving to overcome his handicap through education, he has developed his artistic talents in a most unique manner. By holding the sign painting brushes between his shoulder and chin, he is able to create excellent posters and signs.

This poster took 119 hours to complete and is part of an instruction course Bill is taking at the Williamsport Community College. ♦

Financial Assistance Through Loans and Cost-Sharing

Financial assistance through loans and cost-sharing with individuals and groups in establishing certain conservation practices is provided under the Agricultural Conservation Program; through loans and cost-sharing under the Watershed Protection and Flood Prevention Program, Resource Conservation and Development projects, and the Great Plains Conservation Program; and through the State Forestry departments. ♦

Cranberry growers reshape bogs for water picking

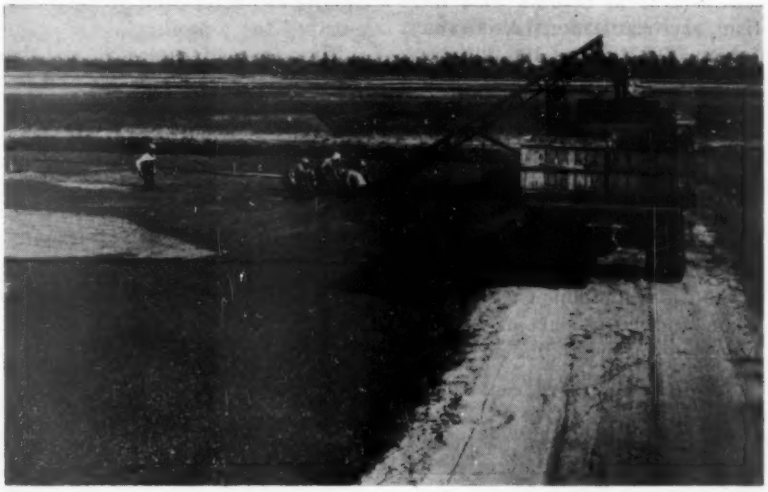
By William H. O'Donnell
Conservation technician, SCS, Mount Holly, N. J.

New Jersey cranberry growers are drawing on Soil Conservation Service experience in water management to make bog layout, dikes, and water-storage dams compatible with a new water-picking method. Soil conservation district cooperators have the assistance of SCS specialists in planning and installing their new water-control systems.

A bog size of 4 to 5 acres seems best for the type of water picker used in New Jersey. With this size, a crew of three or four men can pick, float, and remove the cranberries in 1 day.

For this mechanized operation, dikes are built in parallel at 200-foot intervals. After a core trench is dug to give a firm foundation of mineral soil, sand is trucked in to build and shape each of the dikes.

SCS specialists put up stakes to help growers determine proper grade and width. Dikes are normally 1 foot higher than the winter flood elevation and 12 feet wide at the top with a slope of 1½ (horizontal) to 1 (vertical).



Precisely leveled bogs are needed for uniform ripening of cranberries and efficient operation of the picking machines (above). Squares of cranberry vines, cut from the construction area, are used to stabilize sides of a new dike (left below) in the Burlington County Soil Conservation District. In the water-picking method, cranberries are floated to near the dike where they are picked up and loaded into pallet boxes on trucks (below).

When the core trench is dug, a layer of vine growth is laid aside to be used on the sides of the dike to prevent bank sloughing. Around water-control structures, or trunks, this turf is usually laid in brick fashion.

In some trial plantings, a weeping lovegrass-jute mesh cover has shown promise for stabilizing dike sides until native vegetation is established.

Dams for water storage are more complicated than the low dikes that separate bogs. The trunk is altered to form a pipe spillway, and an emergency spillway is added to safely carry from 90 to 95 percent of the flow from a 25-year frequency storm. SCS helps with the design of the dam and recommends seeding with adapted plant covers such as Kentucky 31 fescue, weeping lovegrass, and sericea lespedeza. ♦

Thai farmer gets assistance

Fish to supplement his family's diet of rice and vegetables and fish for market are the early rewards of a Thai farmer's practice of soil and water conservation with the help of the Thailand Department of Land Development and the USDA Soil Conservation Service's technical aid team.

Ten months after Nai Kod completed his fish ponds and stocked them with fingerlings provided by the Thai Fisheries Department, he harvested 210 kilograms (about 470 pounds) of fish and sold them in bulk to a local fish merchant for 2,100 baht (about $105). About 100 kilograms of fish were eaten by the Kods and their neighbors.

The Kods live in Ban Kok Su village in Changwad Kalasin province of northeast Thailand. Technical assistance in planning the ponds and the rest of the farm was provided by Khun Sunthorn, chief of the Kalasin Mobile Conservation Team, formed as part of the conservation program under a joint agreement between the Thailand government, the U.S. Agency for International Development, and the U.S. Department of Agriculture.

In addition to the fish ponds, Nai Kod is planting a coconut orchard on gradient terraces and along the edges of two grassed waterways. These waterways will safely convey the surplus rainwater down the 4 to 5 percent slopes and into the pond area.

A compost pit is being used to produce fertilizer and mulch material for the new coconut orchard. A good fertilizer program supplemented by green manure, a systematic rotation of upland crops, contour cultivation along the terraces, good seed varieties, and insect and weed control, round out the conservation plan.—CLYDE T. LOWE, *soil conservation adviser, SCS, Kohn Kaen, Thailand.* ♦

Molasses for the pepper fields

How specialized can you get? Everybody knows the McIlhenny Company as a major producer of pepper in Louisiana.

Growing pepper is a specialized kind of farming with its own special soil management problems. The McIlhenny folks and the Soil Conservation Service folks have come up with their own special answer to the problem of conditioning soil after land grading has removed the topsoil.

They spread molasses on the land to add organic matter and restore tilth.

Pepper fields are precision graded to reduce erosion and to manage water for better drainage and irrigation. In the process of landforming on the McIlhenny farm in the Iberia-Vermilion Soil Conservation District, about 3 feet of soil was removed. The first year after the grading, the exposed subsoil produced very little growth of soybeans or pepper.

The McIlhenny Company with the assistance of SCS formulated a plan to incorporate available byproducts of sugarcane, rice, and livestock into the soil.

One of the field trials was the application of sugarcane molasses at the rate of 5 tons an acre on newly graded pepper land. Early results are encouraging.

The molasses penetrated the soil well. Since it consists largely of sugars, it provided food for fungus growth and other micro-organisms. The fungus decomposed and created a residue of humus-like material that had a profound effect on the physical condition of the soil.

The McIlhenny Company is well pleased with the pepper yield from the land treated with molasses and with finding a profitable use for a byproduct of an important local crop.—DOLAN KLEINPETER, *work unit conservationist, SCS, New Iberia, La.* ♦

America The Beautiul Photos in Corn Palace

The renowned "World's Only Corn Palace" in Mitchell, S. Dak., now proudly displays the "America The Beautiful" agricultural parade of the States exhibit produced by the SCS.

These "America The Beautiful" prints were provided by the Davison County Soil and Water Conservation District supervisors and were framed and mounted by the MitchellChamber of Commerce and hobbyist, William Doescher. The photos hang in the corridors of the Corn Palace and are exhibited as part of the daily tours conducted during the summer months for about 250,000 tourists from all parts of the United States and other countries. The tourists come annually to view the striking agricultural mosaics made of the many different colored ears of corn.

Now they seek out their home State photo from among the 52 photographs in natural color representing soil and water conservation activities of farmers and ranchers in each of the 50 States, Puerto Rico, and the Virgin Islands. During other seasons the pictures will be viewed by thousands of persons attending stage and athletic performances.

The Corn Palace has a history dating back to pioneer days. The original Corn Palace was constructed in 1892, and the present structure built in 1905 was remodeled in 1965 at a cost of about $750,000.

Each year the palace is rede-

corated during Indian Summer for about $15,000. This redecoration requires around 2,000 or 3,000 bushels of corn, all in their natural color. The individual cobs, with the corn on, are sawed lengthwise; the halves nailed, flat side in, to wooden panels fastened to the brick walls of the building.—JAMES C. HUNT, *work unit conservationist, SCS, Mitchell, S. Dak.* ♦

Plants, soil used to purify sewage effluent

Plant-soil filters may help convert sewage effluent into water for cities and farms, reports Dr. Herman Bouwer, researcher at the USDA Water Conservation Laboratary at Phoenix, Ariz.

Effluent from a sewage-treatment plant is channeled through grass-covered basins. The grass increases flow turbulence, thus hastening replenishment of oxygen in the water. It also provides an anchoring place for aerobic bacteria that digest organic substances in the water.

The water is further purified as it percolates through the soil. By providing a prepercolation treatment of the water, the grass may increase the rate at which the basins can accept water.

The potential of plant-soil filters is twofold: They can be used to recharge ground-water supplies in arid regions such as central Arizona, where the water table is being lowered at a rate of about 10 feet a year; and they can help reduce stream pollution in the humid East, either by cleaning sewage effluent before it reaches waterways, or by cleaning it and pumping it up as ground water without ever discharging it into the waterways. ♦

Soil conservation protects soil

Soil conservation concerns itself with using the land as efficiently as possible while protecting the soil. ♦

Meetings . . .

Resources conference devoted to preserving human environment

"Balancing Future Resource Uses" will be the theme of the 33d North American Wildlife and Natural Resources Conference in Houston, Tex., March 11-13.

Human environment and what can be done to preserve and improve it will be discussed by distinguished speakers in two general sessions. The first of these, "Balancing Future Resources," opens the conference on Monday morning, March 11.

The second general session, "Achieving a Better Environment," closes the conference on Wednesday afternoon. The rest of the time will be devoted to six technical sessions. These include "Forest and Range Resources," "Field and Farm Resources," and "Exotic and Endangered Wildlife."

Resource administrators, biologists, outdoor writers, and other conservation-minded persons will be attending from the United States, Canada, and Mexico. There will also be representatives from Europe and Africa. All sessions are open to the public, and there is no charge for registration.

Dates and places

March 8-10, National Wildlife Federation, Houston, Tex.

10-12, National Research Council, Washington, D. C.

10-13, The Wildlife Society, Houston, Tex.

10-14, Association for Supervision and Curriculum Development, Atlantic City, N. J.

11-13, North American Wildlife and Natural Resources Conference; Houston, Tex.

12-16, American Camping Association, Boston, Mass.

25-28, Associated General Contractors, Dallas, Tex.

29-30, National Conference on Rural Health, Seattle, Wash.

29-Apr. 2, National Science Teachers Association, Washington, D. C.

29-Apr. 2, National Farmers Union, St. Paul, Minn.

April

1-5, National Council of State Garden Clubs, Biloxi, Miss.

29-May 3, League of Women Voters, Chicago, Ill. ♦

"Live with nature" is wildlife week theme

Conservation education as the key to good resource use and management will be the highlight of this year's National Wildlife Week, to be observed March 17-23.

"Learn to Live With Nature" is the theme for the special week during which many special events and programs will be arranged by conservation organizations in cooperation with the National Wildlife Federation throughout the country to call attention to the need for intelligent use and management of all natural resources.

In stressing the importance of conservation education, the federation points out that conservation should be a part of every school program, and at the same time the adult community should be made aware of conservation needs in maintaining a quality environment.

Local programs will be planned under the guidance of State chairmen named by the federation. Among the special observances suggested by the federation are such things as conservation programs for civic, church, and youth

groups, news features and radio and TV programs on conservation, window displays and special exhibits, and poster and essay contests for schools.

The annual Wildlife Week observance dates back to 1938 when President Franklin D. Roosevelt issued the first nationwide proclamation to mark the occasion. ♦

Conservation Commandments

(1) STUDY the land so that each acre may be used wisely according to its capabilities and treated according to its needs.

(2) GUARD well the living soil, that it may continue to nurture man:

Clothe it lovingly with vegetation,
Hold on to it tenaciously,
Restore its fertility and organic content,
Improve it as a legacy for posterity.

(3) REVERE water, the lifeblood of civilization:

Retard it on the surface,
Trap it in the soil,
Guard its purity zealously.

(4) CHERISH forests that they may—

Conserve water,
Shelter wildlife,
Provide for our needs,
Restore our tranquility.

(5) RESPECT all living things as having a role, however humble, in the balance of nature.

(6) PROVIDE living museums, samples of primeval America, to be managed by nature alone, so that they may—

Serve as reservoirs of wild species that may be needed tomorrow,
Provide control areas against which man's efforts at management may be measured.

(7) LEARN to live in harmony with nature in an ecological symphony, a mutually beneficial dependency.—M. GRAHAM NETTING, *director, Carnegie Museum. Reprinted from Carnegie Magazine.* ♦

Shooting Preserve Management: The Nilo System. BY EDWARD L. KOZICKY AND JOHN MADSON. *1966. The Winchester Western Press, East Alton, Ill. 311 pp., illus. $4.95.*

Important to any new business are tested specifications for the physical plant and reliable do's and don'ts for its operation. This book goes a long way toward providing this kind of information for shooting preserves.

A shooting preserve is a specially developed area upon which pen-raised game birds are released for sport hunting. It is a recreational enterprise, organized and operated for the purpose of providing good shooting for a stipulated price.

Shooting preserves have nothing to do with wild game; the birds that are shot have been carefully reared and conditioned for that purpose. Neverless, a well-planned, carefully run shooting preserve provides challenging, fast, and realistic shooting.

Although the shooting preserve idea is an old one, its real development has occurred in the past 15 years. As cities grew larger, nearby hunting opportunities became fewer. At the same time personal incomes increased and shorter working hours provided more time for recreation. From these and associated factors came a need for a type of sporting opportunity that shooting preserves provide.

This book discusses practically every aspect of shooting preserve development and managment. Included are detailed discussions of how to buy, rear, house, feed, release, and hunt the four game birds commonly used on shooting preserves: mallards, pheasants, bobwhite, and chukars.

Of equal importance are the discussions of economics, insurance, promotion, safety, and many other matters important to the operator of a shooting preserve.

Anyone concerned with the operation of a shooting preserve or contemplating such a business will find this book to be exceedingly helpful.—LAWRENCE V. COMPTON, *head biologist, SCS, Washington, D. C.*

The Agricultural Research Service. BY ERNEST G. MOORE. *1967. 244 pp., illus. Frederick A. Praeger, New York. $5.95.*

Although this is the ninth book in the Praeger Library of U. S. Government Departments and Agencies, it is the first to deal with an agency of the Department of Agriculture.

And although the author was for many years director of information for the agency, he takes this means of calling attention to the generally poor job the Agricultural Research Service has done in "tooting its own horn."

For example, how many people realize the part ARS played in bringing penicillin into wide use; making plastics from castor beans; developing drip-dry cotton, frozen orange juice, instant mashed potatoes, and shrink-proof woolens; developing crime detection techniques; and inventing the aerosol container?

Mr. Moore has done a superb job of showing that the clientele served by ARS is far broader than farmers alone; that, in fact, the work of the agency has impact on urban and rural people alike. Protecting man, his animals, and his plants against diseases and insects; learning better ways to improve, protect, and use the Nation's two basic resources—soil and water; and contributing to the Nation's efforts to help other countries feed, clothe, and shelter their people are but three general examples.

In addition to telling the story of the functions and contributions of ARS, Mr. Moore takes his readers behind the scenes and speaks

candidly about internal weaknesses and methods of operation. His references to dealings with the Congress, the tightrope ARS officials must walk between the Administration position and wishes of members of Congress, and how outside pressures often bring about actions long sought within the agency itself, will be enlightening to readers outside of Government circles.

Many in and out of USDA will be disappointed that more details aren't given on the struggle between the States and the Department leading to the establishment of the Cooperative State Research Service. Many will be interested to learn, however, that several well-known agencies of the Federal Government not now in USDA originated there. Among these are the Weather Bureau, the Bureau of Public Roads, Fish and Wildlife Service, and the Food and Drug Administration.

The only error of concern to SCS readers is the implication that the periodic statements of SCS research needs are addressed to only a single division of ARS. As a matter of fact, these statements of research needs go to the State Experiment stations, the Forest Service, and the Fish and Wildlife Service of USDI, as well as to several divisions of ARS.

This is a fascinating account of one of our sister agencies in the Federal establishment. I can hardly wait to read others dealing with agencies in USDA.—D. M. WHITT, *director, Plant Sciences Division, SCS.*

Pockets of Hope: Studies of Land and People. BY MARTHA E. MUNZER. *1967. Alfred A. Knopf, New York (for the Conservation Foundation). 209 pp., illus. $4.50.*

"Pockets of Hope" are five depressed regions where the people by their own efforts have made viable communities in which to live, work, and play.

Martha Munzer tells their experiences in the latest of a series of books for young people prepared under the sponsorship of the Conservation Foundation.

The regions are the coal mining area of Wilkes-Barre, Pa., the lands occupied by the Santa Clara Pueblo Indians in New Mexico, the iron country of Marquette, Mich., the Johnson Creek watershed in the cotton country of Tennessee, and the panhandle of southeastern Alaska.

Each story includes a brief history of the region and of the use of its natural resources. More detail about current problems and how present-day leadership has motivated the people to self-help and cooperation with the Government, with less about history, might have helped the reader understand better what made the people's ambitions and desires come true.

Even so, this book makes excellent reading for anyone interested in history, people, and resource development.—JAMES F. HUGHES, *Resource Development Division, SCS, Washington, D. C.*

New publications

Sediment—It's Filling Harbors, Lakes, and Roadside Ditches. *1967. USDA Agr. Inf. Bull. 325. 16 pp., illus. $0.15.* The bulletin states that there is no longer any doubt that erosion and sedimentation are many times as costly as soil conservation and presents data to support this conclusion. It supersedes Agr. Inf. Bull. 174, "Sediment Is Your Problem—Wasted Soil and Water."

Sediment is a national problem. It damages crops and cropland, reservoirs and ponds, roads, railroads, and navigation channels. It causes more frequent floods and hurts recreation and public health. Sediment comes from farmlands, riverbanks, roads, construction sites, and industrial and mine wastes.

Some of the practices to reduce sediment are contour farming, terracing, contour stripcropping, controlled grazing, returning steep cultivated land to woods or pasture, and stabilizing stream channels. Builders can control sediment by providing temporary cover, such as annual grasses and small grains, or sod, mulch, burlap, or plastic.

This booklet pictorially shows examples of the problems and its remedies.

Irrigated Pastures for Forage Production and Soil Conservation in the West. BY JOSEPH W. TURELLE AND WAYNE W. AUSTIN. *1967. USDA Farmers' Bull. 2230. 22 pp., illus. $0.15.* Superseding Farmers' Bulletin 1973 on the same subject, this bulletin recommends the use of irrigated pastures when the pastures produce greater net returns per acre than other field crops, and frequently they do. A pasture planning program; tables listing major grasses and legumes, soil moisture interpretation, rotation grazing, and different levels of management; starting the plants; management during establishment; and managing established pastures are presented.

Tourism and Recreation. BY ARTHUR D. LITTLE, INC. *1967. U. S. Dept. Commerce, Econ. Develop. Admin. 301 pp.* Surveys much of the research already done in the field of domestic travel and outdoor recreation in the country and assembles a broad data base to aid in planning and promoting a wide variety of outdoor recreation and travel activities and in measuring their impact on the regional economy. The study was made under contract with the Economic Development Administration.

Farm Commodity and Related Programs. *1967. USDA Agr. Hbk 345. 150 pp. $0.45.* Compilation and summary of farm commodity and resource programs for which price support, stabilization, and related programs are administered by USDA; supersedes Agricultural Information Bulletin 135, *Price Programs.*

Science and Saving Water and Soil. BY AGRICULTURAL RESEARCH SERVICE. *1967. USDA, Agr. Inf. Bull. 324. (12 pp.), illus. $0.20.* A popular account of some of the ways that research scientists have helped find answers to a wide range of problems in controlling and using water and in reducing soil erosion and sedimentation.

Managing Public Rangelands. BY RICHARD S. DRISCOLL. *1967. USDA AIB 315. 30 pp., illus. $0.15.* Presents the basic principles of various grazing practices and systems that might be used on National Forests and National Grasslands.

White Americans in Rural Poverty. BY ALAN R. BIRD AND JOHN L. MCCOY. *1967. USDA Agr. Econ. Rpt. 124. 18 pp., illus.* Estimates concerning the extent of the white poverty problem based on an extension beyond the census definition of rural to include all nonmetropolitan territory outside of central cities and urban fringe.

Conversion of Chaparral Areas to Grassland. By Jay R. Bentley. *1967. USDA Agr. Hbk 328. 35 pp., illus. $0.30.* Information applies to the chaparral within the brushland zone that lies below California's commercial timber belt and includes about 11 million acres of chaparral and associated types and 9 million acres of woodland types.

Atlantic Continental Shelf and Slope of the United States: Geologic Background. By K. O. Emery. *1966. U. S. Geol. Surv. Prof. Paper 529-A. 23 pp., illus. $0.30.* First of a series of reports that describe the geological, biological, and hydrological characteristics and the geological history of the continental shelf, slope, and rise of the Atlantic Coast of the United States.

Sprinkler irrigation. By Claude H. Pair. *Rev. 1966. USDA Leaflet 476. 8 pp. illus.* Describes different systems and recommends use on soils that have high intake rates, on fields that have steep slopes or irregular topography, and on soils that are too shallow to be leveled.

The Disparity Between Present Rates of Denudation and Orogeny. By S. A. Schumm. *1963. U. S. Geol. Surv. Prof. Paper 454-H. 13 pp., illus. $0.20.* It is concluded that hillslope form is more a function of the difference between the rates of hillslope erosion and stream incision than of rates of uplift.

Erosion and Deposition Produced by the Flood of December 1964 on Coffee Creek, Trinity County, California. By John H. Stewart and Valmore C. LaMarche, Jr. *1967. U.S. Geol. Surv. Prof. Paper 422-K. 22 pp., illus., with maps in pocket.*

Poison Ivy, Poison Oak, and Poison Sumac. By Donald M. Cross and Dayton L. Klingman. *Rev. 1967. USDA Farmers' Bull. 1972. 16 pp., illus. $0.10.* Identification, precautions, and eradication given.

Saving the Forests and Related Wildlife Resources From Insects and Diseases. *Rev. 1967. USDA PA-666. 12 pp., illus.* Booklet outlines the U. S. Forest Service's responsibilty to protect the Nation's forests against destructive pests. It supersedes PA-593, "Holding the Line."

What You Can do About Water Pollution. *1967. U.S. Dept. Int., Federal Water Pollution Control Admin. $0.10.* A colored folder showing that the builder, the farmer, the industrialist, the boat owner, and everybody can do something about water pollution.

Farm Costs and Returns: Commercial Farms by Type, Size, and Location. *Rev. 1967. USDA Agr. Inf. Bull. 230. 101 pp., illus. $0.55.* An estimate of costs and returns for 1966 and other recent years on 44 important types of commercial farms in 25 major farming areas in the United States as well as a brief analysis of changes that have occurred in production, prices, income, and costs for each of these types of farms.

Financing Industrial Development Through State and Local Governments. *1967. USDA Agr. Econ. Rpt. 128. 14 pp.* Provides basic information about the way States can provide financial assistance to new firms and those that wish to expand or relocate.

Supplement to Age of Transition—Rural Youth in a Changing Society. By Economic Development Division, Economic Research Service. *1967. USDA Supplement to Agr. Hbk. 347. 41 pp.*

Age of Transition: Rural Youth in a Changing Society. *1967. USDA Agr. Hbk. 347. 92 pp., illus. $0.75.* Produced in USDA in cooperation with the Departments of Labor; Interior; Health, Education, and Welfare; the Office of Economic Opportunity; and the President's Council on Youth Opportunity, as well as a number of private organizations. It supplements the information and insights provided by the National Outlook Conference on Rural Youth and serves as a resource for work in behalf of rural youth at State and local levels.

Weather and the Hand of Man. *1967. U. S. Dept. Commerce, Environmental Sci. Serv. Admin. 16 pp., illus. $0.30.* Discusses the modern era of weather modification.

Differential Assessment of Farmland Near Cities. By Peter W. House. *1967. USDA ERS 358. 39 pp., illus.* Experience in Maryland through 1965.

Soil surveys

Ionia County, Michigan. By George Threlkeld and Stanley Alfred. *1967. 167 pp., illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by Carl Eby, Lynn Kannenberg, Warren Studley, W. A. Van Eck, Robert Johnson, Richard Larson, and Karl E. Pregitzer.

Carroll County, Virginia. By W. E. Thomas, Jr., L. E. Williamson, D. L. Smith, R. L. Hodges, F. W. Hursey, and G. V. Wilson. *1967. 109 pp., illus.; maps 4 inches to the mile (1:15,840).*

Republic County, Kansas. By C. H. Atkinson and Donald A. Gier. *1967. 61 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

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From the Administrator:

Wildlife Is Not a Resource Apart

In his recent statement of conservation policy, *Resources in Action*, the Secretary of Agriculture reiterated a position always subscribed to by the Soil Conservation Service: that no resource can be managed by itself and that no resource agency can carry out its program independently of others.

"A narrow piecemeal approach of dealing with one resource, or one use, or one purpose at a time cannot provide lasting solutions," says the statement on USDA Responsibilities in Creative Conservation.

"Nor can it build harmony into the dynamic ecological system that is man's total environment. Rather, through skillful coordination of uses and planned management of resources, we can and must reverse the downward trend in the quality and adequacy of the natural world in which we live.

"Only through widespread positive actions designed to blend uses harmoniously can we protect and sustain our natural environment and produce optimum combinations of goods and services from the Nation's soils, forest, range, water, wildlife, and other resources."

The necessity and the success of coordinated effort—with respect both to the various resources and the various agencies—is nowhere better illustrated than it is with fish and wildlife.

Wildlife, like man himself, is completely dependent on the other natural resources—soil, water, and plants—as elements of its environment. Obviously, it is a resource that cannot be "conserved" or managed apart from the others. By the same token, conservation agencies concerned with wildlife must work in concert with all those dealing in any way with land, water, forests, or grassland.

The Soil Conservation Service is progressively strengthening its working relationships with the agencies responsible for the Nation's wildlife resources. A recent and fruitful development is the Joint Soil Conservation Service-Fish and Wildlife Service Coordinating Committee on Watershed Development.

Through that committee, small watershed programs are evaluated, interagency coordination is promoted, and special problems studied and solved. The committee members agree that small watershed work plans must consider all natural resource interests. They recommend that fish and wildlife considerations be presented factually to the sponsors of each project. In many cases, a joint biological report endorsed by the State, the Fish and Wildlife Service, and SCS is prepared evaluating the fish and wildlife resources of the project area and recommending habitat protection and improvement measures.

An example of cooperation on a broader scale is the International Migratory Bird Committee, created several years ago to provide a forum for the informal consideration of waterfowl management problems in Canada and the United States. A representative of SCS serves on this committee as it seeks ways to safeguard a wildlife resource that moves back and forth across international boundaries and depends on the land and water resources of both countries.

The goal of such cooperative effort is of deeper concern than the size of the hunter's bag or the income a landowner may derive from the recreational use of his land. Not only the game species but all forms of wildlife are important to people in many different ways—to countless people who never use a gun or fishing rod as surely as to those who do. The maintenance and improvement of wildlife habitat is at the same time the care of the environment of man himself.

Only recently have we begun to recognize the responsibilities and obligations that go with man's domination over nature. We have been late to see that our environment is also the environment of the other creatures of earth and that we need them for esthetic and spiritual reasons whether or not there is any economic value involved.

Now we are learning that we want—and need—the scene as we remember it from other times and places, or as we have had it described to us by others more fortunate. Now we are becoming disturbed to find country roads used as trash dumps, incensed to find old tires and tin cans in fishing streams, broken glass and tar on the beaches, turbid polluted water in lakes.

As stated in the Agriculture/2000 publications, it is USDA policy—recognizing both man's needs and obligations—to work toward a better and more wholesome environment for all, to develop rural communities where the benefits of community living are accompanied by enjoyment of a beautiful countryside, to help fight erosion and floods and pollution and other despoilers of natural beauty.

The Soil Conservation Service sees as an important part of its role the protection and improvement of quality of environment for both wildlife and people.

Surely, such an important purpose is worthy of the best efforts of every landowner and every resource agency.

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Conservation in Tunisia a better way of life

By James G. Moorefield
Work unit conservationist, SCS, Wichita, Kans.

The village of La Kesra in Tunisia overlooks the upper reaches of the Marguellil River watershed, a 60-mile long valley of severe drought and floods and of too many people and livestock for its meager resources.

In 1964, a small group of Soil Conservation Service conservationists arrived under terms of a Participating Agency Service Agreement with the Agency for International Agricultural Development to help the Tunisian people develop a plan for soil and water conservation in the valley.

The valley receives an average annual rainfall ranging from 19 inches in the upper reaches to 8 inches in the lower. At present the only resource is agriculture. A better life for all is possible only through sound soil and water management. The job of accomplishing this was tackled by the conservationists.

An overall plan for land and water management for the Marguellil River Valley that entailed a series of flood-prevention reservoirs supported by needed land use and treatment measures was soon prepared. At the downstream point of the upper subwatershed, a key structure in the series was planned.

Other conservation practices for the upper subwatershed included: Constructing 180 miles of broadbase terraces and 25 miles of diversions, 12 farm ponds, 35 miles of barbed wire fence to enclose selected pastures for grazing management demonstration purposes; 12 rock crossings where waterways cross farm roads; shaping and establishing to permanent sod 260 acres of waterways for terrace outlets; digging four wells; developing three springs; seeding 2,800 acres to pasture; planting 860 acres to fruit orchards and 1,800 acres to forest trees; deferring grazing and practicing range management on 10,000 acres of rangeland; stopping grazing for 5 years on 23,000 acres of rough land to receive special treatment for watershed protection and sediment control; and building or relocating 12 miles of farm roads.

A crew of Tunisian laborers constructs a rock road crossing. At this point a waterway crosses the farm road. All work is done by hand labor.

By the end of 1966, more than half of the planned measures on cropland, orchard, pasture, and woodland had been applied. One 600-acre field had been planted to perennial pasture grasses and enclosed by a 5-wire fence, something new in an area where grazing had been controlled by shepherds since before the time of Abraham.

Basic cropland practices, such as conservation cropping system, crop residue use, and contour farming, along with deferred grazing on rangeland and the cessation of grazing on watershed protection land were started in 1967. Several years will be necessary to bring these measures to fruition.

The conservationists hope that La Kesra will see the results of proper use and treatment of its land. ♦